



TENTATIVE

All information in this technical data sheet is tentative
and subject to change without notice.

12.1" SVGA

TECHNICAL SPECIFICATION

COMPANY PROPRIETARY
NOT TO BE REPRODUCED OR DISCLOSED WITHOUT SPECIFIC
WRITTEN PERMISSION OF MITSUBISHI ELECTRIC CORPORATION
(THIS IS A RED INK STAMP)

AA121SM02

MITSUBISHI ELECTRIC Corp.

Date: Jun.25,'09



CONTENTS

No.	Item	Page
--	COVER	1
--	CONTENTS	2
1	APPLICATION	3
2	OVERVIEW	4
3	ABSOLUTE MAXIMUM RATINGS	5
4	ELECTRICAL CHARACTERISTICS	5, 6
5	INTERFACE PIN CONNECTION	7, 8
6	INTERFACE TIMING	9, 10, 11, 12, 13
7	BLOCK DIAGRAM	14
8	MECHANICAL SPECIFICATION	15, 16
9	OPTICAL CHARACTERISTICS	17, 18, 19
10	RELIABILITY TEST CONDITION	20
11	OTHER FEATURE	21
12	HANDLING PRECAUTIONS FOR TFT-LCD MODULE	22, 23, 24



1. APPLICATION

This specification applies to color TFT-LCD module, AA121SM02.

These specification papers are the proprietary product of Mitsubishi Electric Corporation ("MITSUBISHI") and include materials protected under copyright of MITSUBISHI. No part of this document may be reproduced in any form or by any means without the express written permission of MITSUBISHI.

MITSUBISHI does not assume any liability for infringement of patents, copyrights or other intellectual property rights of third parties by or arising from use of a product specified in this document. No license, express, implied or otherwise, is granted under any patents, copyrights or other intellectual property rights of MITSUBISHI or of others.

MITSUBISHI classifies the usage of the TFT-LCD module as follows. Please confirm the usage before using the product.

(1) Standard Usage

Computers, office equipment, factory automation equipment, test and measurement equipment, communications, transportation equipment(automobiles, ships, trains, etc.), provided, however, that operation is not influenced by TFT-LCD directly.

(2) Special Usage

Medical equipment, safety equipment, transportation equipment, provided, however, that TFT-LCD is necessary to its operation.

(3) Specific Usage

Cockpit Equipment, military systems, aerospace equipment, nuclear reactor control systems, life support systems and any other equipment. MITSUBISHI should make a contract that stipulate apportionment of responsibilities between MITSUBISHI and our customer.

The product specified in this document is designed for "Standard Usage" unless otherwise specified in this document. If customers intend to use the product for applications other than those specified for "Standard Usage", they should first contact MITSUBISHI sales representative for it's intended use in writing.

MITSUBISHI has been making continuous effort to improve the reliability of its products. Customers should implement sufficient reliability design of their application equipments such as redundant system design, fail-safe functions, anti-failure features.

MITSUBISHI assumes no responsibility for any damage resulting from the use of the product that does not comply with the instructions and the precautions specified in this document.

Please contact and consult a MITSUBISHI sales representative for any questions regarding this product.

2. OVERVIEW

AA121SM02 is 12.1" color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver ICs, control circuit, and backlight unit.

By applying 6 bit or 8 bit digital data, 800×600 , 262k-color or 16.7M-color images are displayed on the 12.1" diagonal screen. Input power voltage is 3.3V for LCD driving.

The type of data and control signals are digital and transmitted via LVDS interface per Typ. 40MHz clock cycle.

Driver circuit for LED backlight is not included in this module. General specifications are summarized in the following table:

ITEM	SPECIFICATION
Display Area (mm)	246.0(H) $\times$ 184.5(V) (12.106-inch diagonal)
Number of Dots	800×3 (H) $\times$ 600 (V)
Pixel Pitch (mm)	0.3075 (H) $\times$ 0.3075 (V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white TN
Number of Color	262k(6 bit/color), 16.7M(8 bit/color)
Luminance (cd/m ²)	550
Wide Viewing Angle Technology	Optical Compensation Film
Viewing Angle (CR $\geq$ 10)	-80~80° (H) -60~80° (V)
Surface Treatment	Anti-glare and hard-coating 3H
Electrical Interface	LVDS (6 bit/8 bit)
Optimum Viewing Angle(Contrast ratio)	6 o'clock
Module Size (mm)	280.0 (W) $\times$ 210.0 (H) $\times$ 12.0 (D)
Module Mass (g)	750
Backlight Unit	LED, edge-light, replaceable

Characteristic value without any note is typical value.

3. ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX.	UNIT
Power Supply Voltage for LCD	VCC	0	4.0	V
Logic Input Voltage	VI	-0.3	VCC+0.3	V
Backlight (LED) Current	IF	0	180	mA
Operation Temperature (Panel) Note 1,2)	T _{op} (Panel)	-30	80	°C
Operation Temperature (Ambient) Note 2)	T _{op} (Ambient)	-30	80	°C
Storage Temperature Note 2)	T _{stg}	-30	80	°C

[Note]

1) Measured at the center of active area and at the center of panel back surface

2) Top,Tstg ≤ 40°C : 90%RH max. without condensation

Top,Tstg > 40°C : Absolute humidity shall be less than the value of 90%RH at 40°C without condensation.

4. ELECTRICAL CHARACTERISTICS

(1) TFT-LCD

Ambient temperature: Ta = 25°C

ITEM		SYMBOL	MIN.	TYP.	MAX.	UNIT	Remarks
Power Supply Voltage for LCD		VCC	3.0	3.3	3.6	V	*1)
Power Supply Current for LCD		ICC	--	370	550	mA	*2)
Permissive Input Ripple Voltage		VRP	--	--	100	mVp-p	VCC=+3.3 V
Logic Input Voltage	High	VIH	2.4	--	VCC	V	MODE, SC
	Low	VIL	0	--	0.8	V	MODE, SC

*1) Power and signals sequence:

$t_1 \leq 10 \text{ ms}$

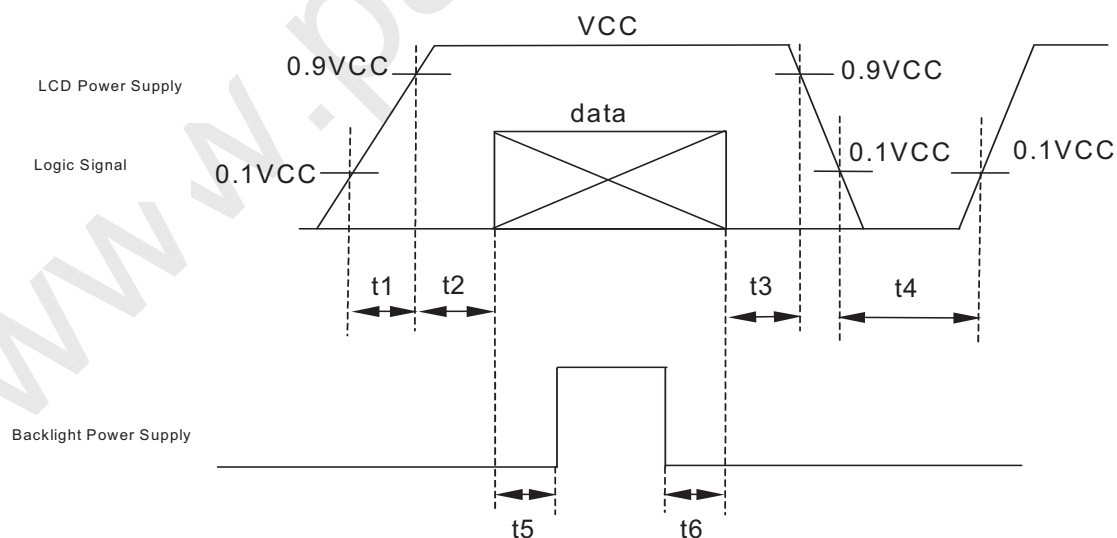
$0 < t_2 \leq 50 \text{ ms}$

$0 < t_3 \leq 50 \text{ ms}$

$200 \text{ ms} \leq t_4$

$200 \text{ ms} \leq t_5$

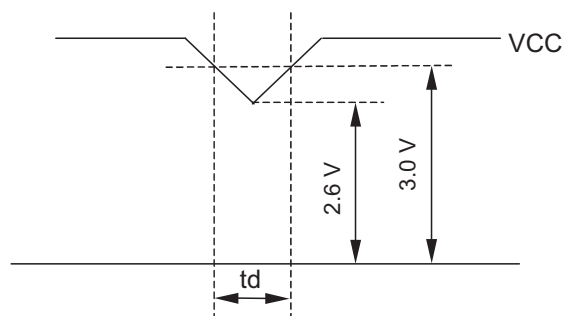
$0 \leq t_6$



VCC-dip conditions:

- 1) When $2.6\text{ V} \leq \text{VCC} < 3.0\text{ V}$, $t_d \leq 10\text{ ms}$
- 2) When $\text{VCC} < 2.6\text{ V}$

VCC-dip conditions should also follow the power and signals sequence.



*2) $\text{VCC} = +3.3\text{ V}$, $f_H = 37.9\text{ kHz}$, $f_V = 60\text{ Hz}$, $f_{CLK} = 40\text{ MHz}$

Display image at typical power supply current value is 256-gray-bar pattern (8 bit), 600 line mode.

*3) Fuse

Parameter	Fuse Type Name	Supplier	Remark
VCC	FCC16162AB	Kamaya Electric Co., Ltd.	*)

*) The power supply capacity should be designed to be more than the fusing current.

(2) Backlight

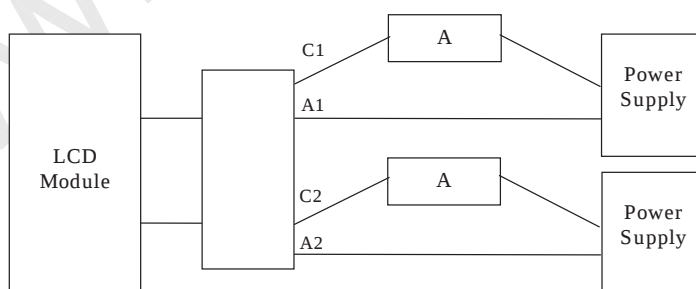
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Remarks
LED Voltage	VF	--	(24)	31.1	V	IF = 120 mA, Ta = 25°C
		--	--	32.2	V	IF = 120 mA, Ta = 0°C
		--	--	33.6	V	IF = 120 mA, Ta = -30°C
LED Current	IF	--	120	130	mA	*1), *3)
LED Life Time	LT	60,000	--	--	h	IF = 120 mA, Ta = 25°C *4), *5), Continuous operation

[Note]

*1) Constant Current Drive

*2) The Voltage deviation between strings: $|V_{f1} - V_{f2}| \leq 2\text{ V}$

*3) LED Current measurement method



*4) LED life time is defined as the time when the brightness becomes 50% of the initial value.

*5) The life time of the backlight depends on the ambient temperature. The life time will decrease under high temperature.

5. INTERFACE PIN CONNECTION

(1) CN 1(Interface Signal)

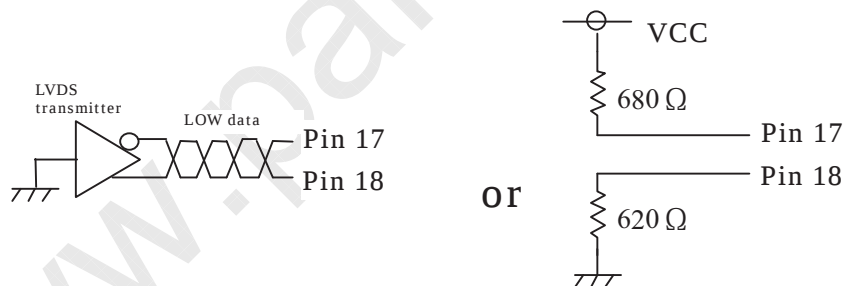
Used connector: FI-SEB20P-HFE (JAE)

Corresponding connector: FI-S20S[for discrete Wire], FI-SE20ME[for FPC] (JAE)

Pin No.	Symbol	Function (ISP 6 bit compatibility mode)		Function (ISP 8 bit compatibility mode)
		6 bit input	8 bit input	
1	VCC	+3.3 V Power supply		←
2	VCC	+3.3 V Power supply		←
3	GND	GND		←
4	GND	GND		←
5	Link 0-	R0, R1, R2, R3, R4, R5, G0	R2, R3, R4, R5, R6, R7, G2	R0, R1, R2, R3, R4, R5, G0
6	Link 0+	R0, R1, R2, R3, R4, R5, G0	R2, R3, R4, R5, R6, R7, G2	R0, R1, R2, R3, R4, R5, G0
7	GND	GND		←
8	Link 1-	G1, G2, G3, G4, G5, B0, B1	G3, G4, G5, G6, G7, B2, B3	G1, G2, G3, G4, G5, B0, B1
9	Link 1+	G1, G2, G3, G4, G5, B0, B1	G3, G4, G5, G6, G7, B2, B3	G1, G2, G3, G4, G5, B0, B1
10	GND	GND		←
11	Link 2-	B2, B3, B4, B5, DENA	B4, B5, B6, B7, DENA	B2, B3, B4, B5, DENA
12	Link 2+	B2, B3, B4, B5, DENA	B4, B5, B6, B7, DENA	B2, B3, B4, B5, DENA
13	GND	GND		←
14	CLKIN-	Clock -		←
15	CLKIN+	Clock +		←
16	GND	GND		←
17	Link3-	See: *2)	R0, R1, G0, G1, B0, B1	R6, R7, G6, G7, B6, B7
18	Link3+	See: *2)	R0, R1, G0, G1, B0, B1	R6, R7, G6, G7, B6, B7
19	MODE	Low=ISP 6 bit compatibility mode		High=ISP 8 bit compatibility mode
20	SC	Scan direction control. (Low : Normal , High : Reverse)		←

*1) Metal frame is connected to signal GND.

*2) Recommended wiring of Pin 17,18 (6 bit input)



(2) CN 2(Backlight)

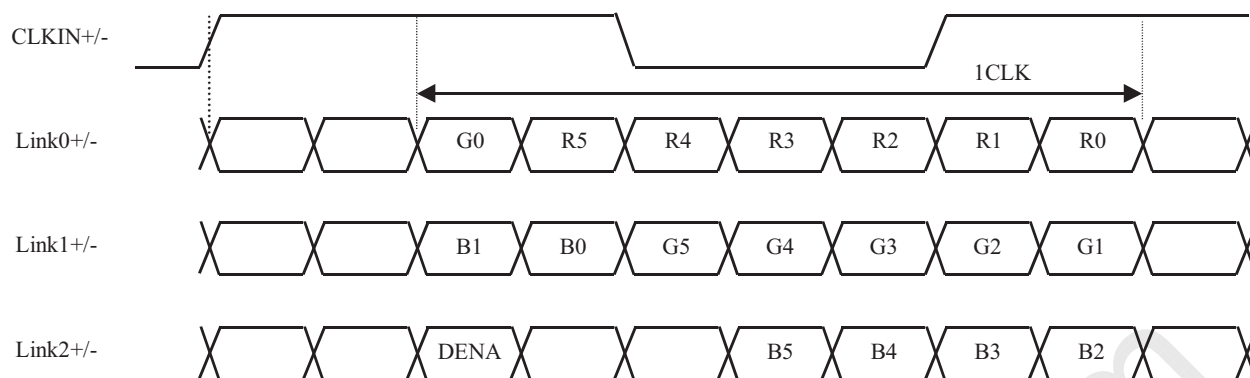
Backlight-side connector: SM06B-SHLS-TF(LF)(SN) (JST)

Corresponding connector: SHLP-06V-S-B (JST)

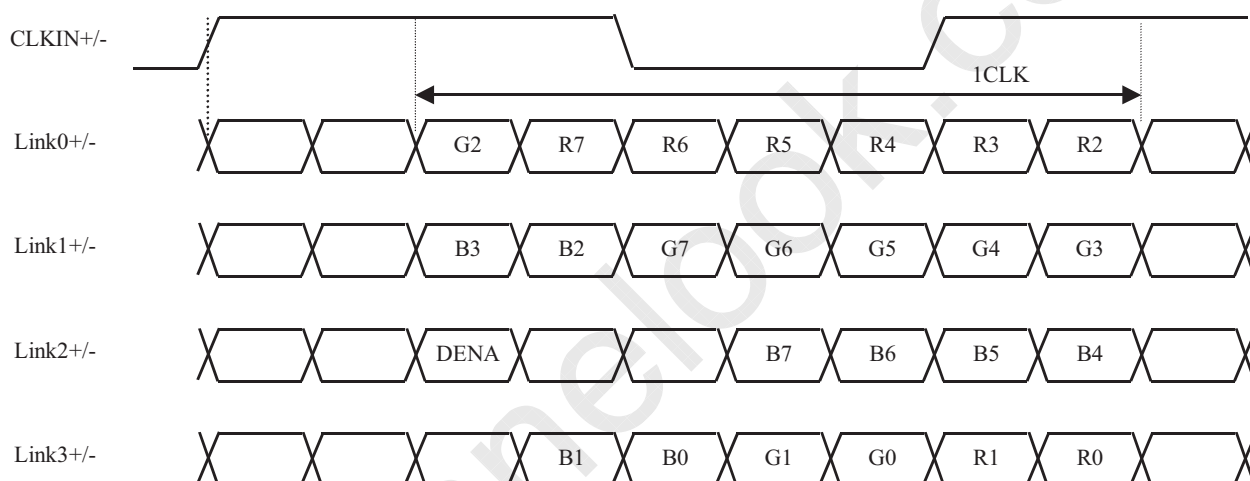
Pin No.	Symbol	Function
1	NC	This pin should be open.
2	NC	This pin should be open.
3	LED C 1	LED cathode 1
4	LED A 1	LED anode 1
5	LED A 2	LED anode 2
6	LED C 2	LED cathode 2

(3) ISP data mapping

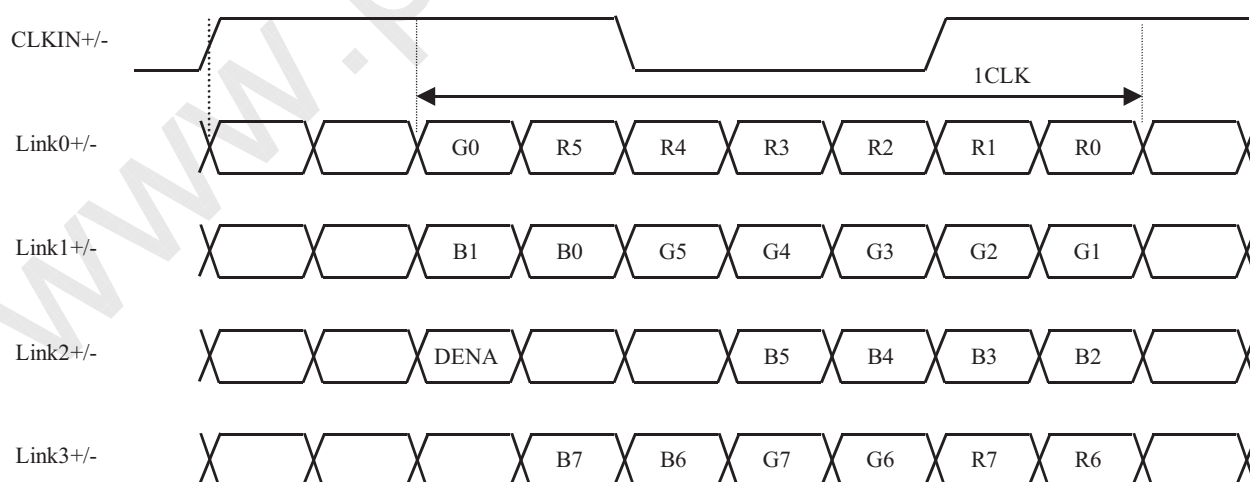
a. ISP 6 bit compatibility mode(6 bit input)



b. ISP 6 bit compatibility mode(8 bit input)



c. ISP 8 bit compatibility mode



6. INTERFACE TIMING

LVDS transmitter input signal

(1) Timing Specifications

ITEM			SYMBOL	MIN	TYP	MAX	UNIT
DCLK	Frequency		f _{CLK}	35	40	42	MHz
	Period		t _{CLK}	23.8	25	28.6	ns
DENA	Horizontal	Active Time	t _{HA}	800	800	800	t _{CLK}
		Blanking Time	t _{HB}	20	256	--	t _{CLK}
		Frequency	f _H	35.2	37.9	39.2	kHz
		Period	t _H	25.5	26.4	28.4	μs
	Vertical	Active Time	t _{VA}	600	600	600	t _H
		Blanking Time	t _{VB}	3	28	--	t _H
		Frequency	f _V	55	60	64.2	Hz
		Period	t _V	15.6	16.7	18.2	ms

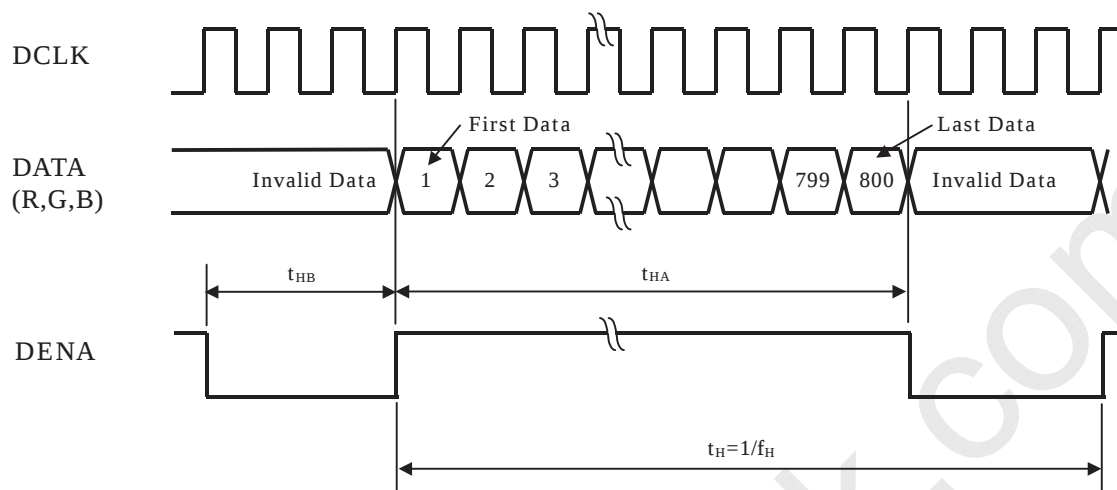
[Note]

- 1) DENA (Data Enable) should always be positive polarity as shown in the timing specification.
- 2) DCLK should appear during all invalid period.
- 3) LVDS timing follows the timing specifications of LVDS receiver IC: THC63LVDF84B(Thine).
- 4) In case of blanking time fluctuation, please satisfy following condition.

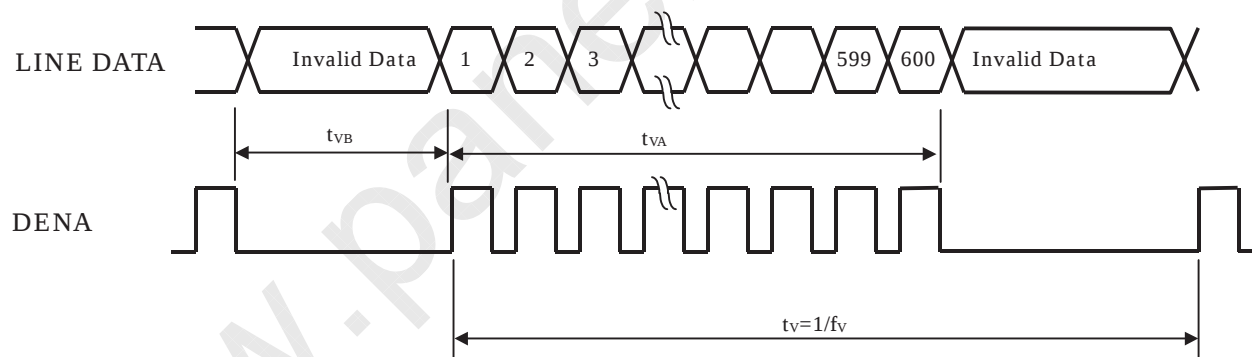
$$t_{VBn} > t_{VBn-1} - 3(t_H)$$

(2) Timing Chart

a. Horizontal Timing Chart



b. Vertical Timing Chart



(3) Color Data Assignment

a. 6 bit input

COLOR		INPUT DATA																	
		R DATA						G DATA						B DATA					
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
		MSB					LSB	MSB						LSB	MSB				
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	0	0	0	0	0	0	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(1)	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(62)	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(63)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	GREEN(62)	0	0	0	0	0	0	1	1	1	1	1	0	0	0	0	0	0	0
	GREEN(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
BLUE	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(62)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	0
	BLUE(63)	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1

[Note]

1) Definition of gray scale

Color (n) --- n indicates gray scale level.

Higher n means brighter level.

2) Data

1:High, 0: Low

b. 8 bit input

COLOR		INPUT DATA																							
		R DATA								G DATA								B DATA							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
		MSB				LSB				MSB				LSB				MSB				LSB			
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(255)	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	GREEN(255)	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	CYAN	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	MAGENTA	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
RED	RED(1)	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	RED(2)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	RED(255)	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
GREEN	GREEN(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0
	GREEN(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
	GREEN(255)	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0
BLUE	BLUE(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	BLUE(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	
	BLUE(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1

[Note]

1) Definition of gray scale

Color (n) --- n indicates gray scale level.

Higher n means brighter level.

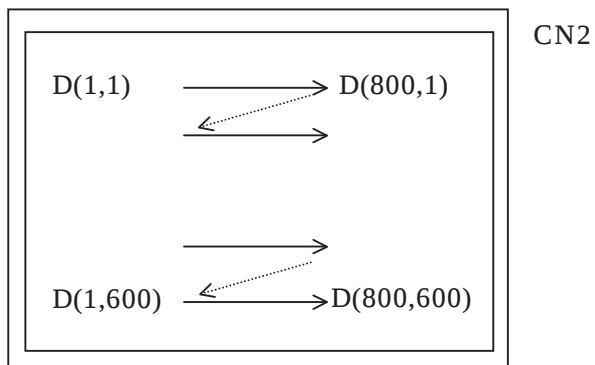
2) Data

1:High, 0: Low

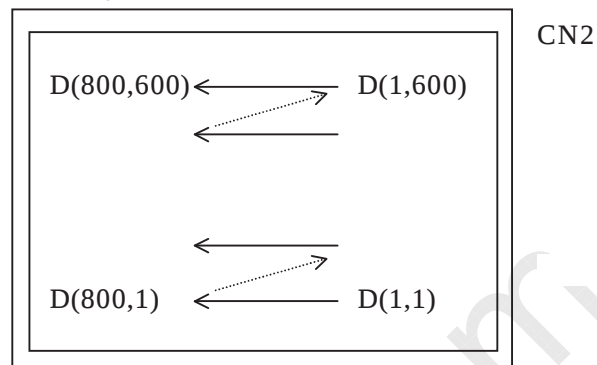
(4) Display Position and Scan Direction

D(X,Y) shows the data number of input signal for LCD panel signal processing PCB.

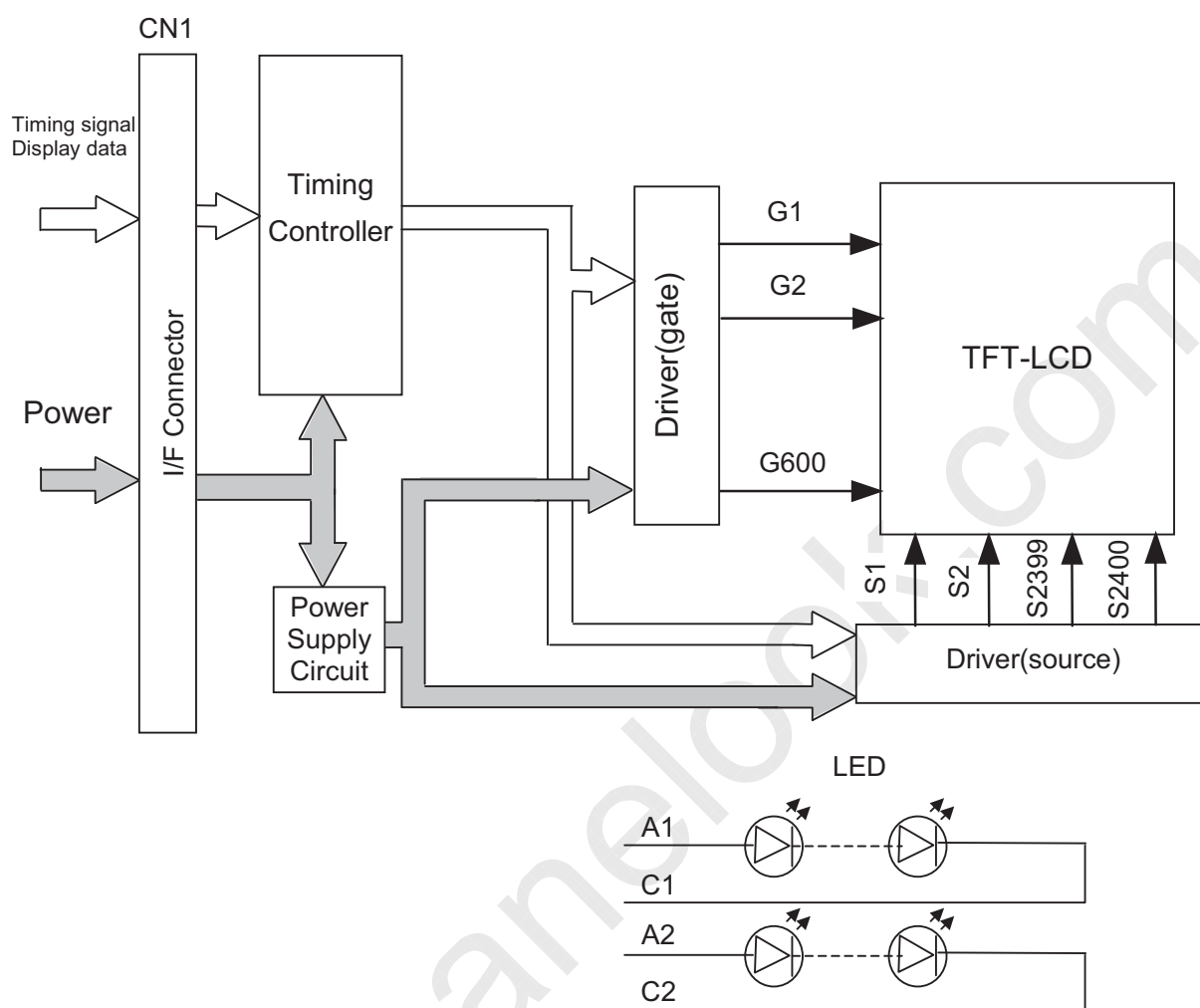
SC:Low



SC:High

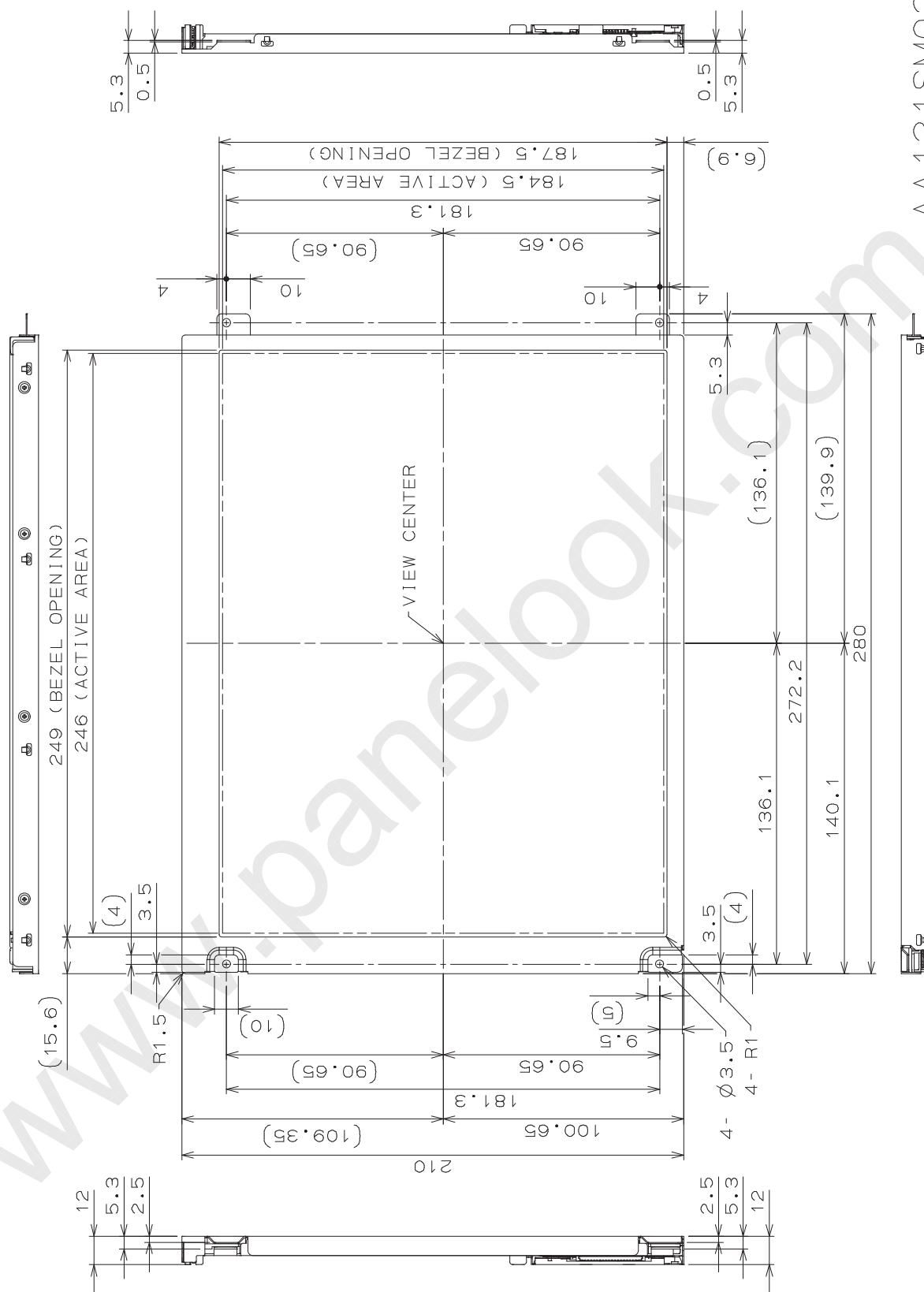


7. BLOCK DIAGRAM



8. MECHANICAL SPECIFICATIONS

(1) Front Side

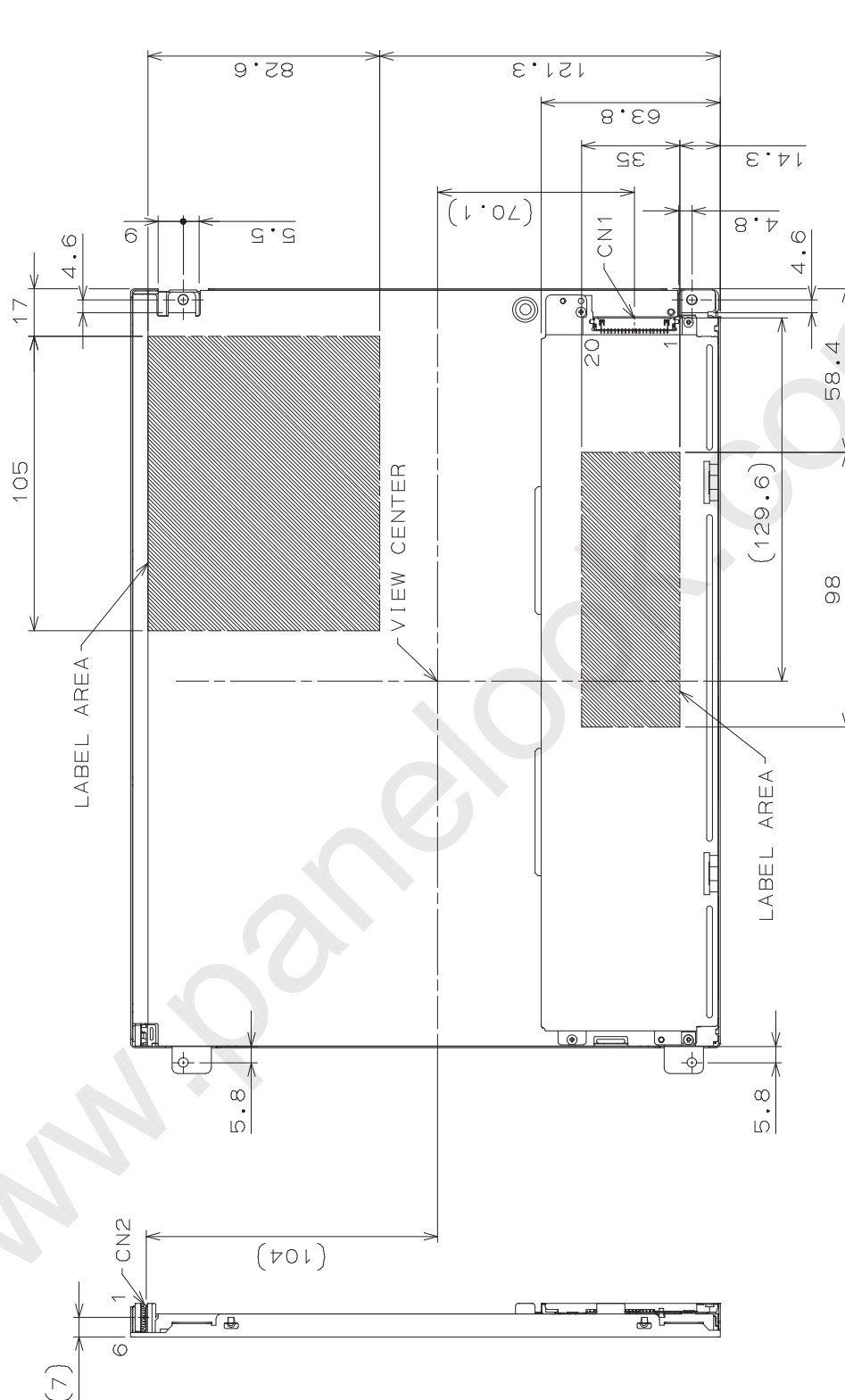


AA121SM02

1) Tolerance is ± 0.5 mm unless noted.
2) Third angle projection

(Unit: mm)

(2) Rear Side



AA121SM02

1) Tolerance is ± 0.5 mm unless noted.
 2) Third angle projection

CN1: F1-SEB20P-HFE (JAE)
 CN2: SM06B-SHLS-TF(LF)(SN) (JST)

(Unit:mm)

9. OPTICAL CHARACTERISTICS

Ta=25°C, VCC=3.3V, Input Signals: Typ. Values shown in Section 6

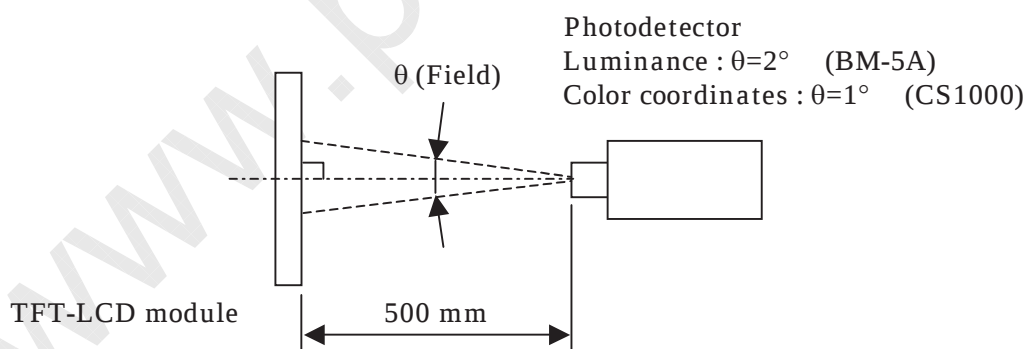
ITEM		SYMBOL	CONDITION	MIN	TYP	MAX	UNIT	Remarks
Contrast Ratio		CR	$\theta_V=0^\circ, \theta_H=0^\circ$	400	600	--	--	*1)*2)*5)
Luminance		L _w	$\theta_V=0^\circ, \theta_H=0^\circ$	440	550	--	cd/m ²	*1)*5)
Luminance Uniformity		ΔL_w	$\theta_V=0^\circ, \theta_H=0^\circ$	--	--	30	%	*1)*3)*5)
Response Time		t _r	$\theta_V=0^\circ, \theta_H=0^\circ$	--	4	--	ms	*1)*4)*5)
		t _f	$\theta_V=0^\circ, \theta_H=0^\circ$	--	12	--	ms	*1)*4)*5)
Viewing Angle	Horizontal	θ_H	CR ≥ 10	-65~65	-80~80	--	°	*1)*5)
	Vertical	θ_V		-45~65	-60~80	--	°	*1)*5)
Image sticking		t _{is}	2 h	--	--	2	s	*6)
Color Coordinates	Red	R _x	$\theta_V=0^\circ, \theta_H=0^\circ$	0.511	0.551	0.591	--	*1)*5)
		R _y		0.304	0.344	0.384		
	Green	G _x		0.314	0.354	0.394		
		G _y		0.522	0.562	0.602		
	Blue	B _x		0.125	0.165	0.205		
		B _y		0.101	0.141	0.181		
	White	W _x		0.273	0.313	0.353		
		W _y		0.289	0.329	0.369		

[Note]

These items are measured using CS1000(MINOLTA) for color coordinates, EZContrast(ELDIM) for viewing angle and CS1000 or BM-5A(TOPCON) for others under the dark room condition (no ambient light) after more than 30 minutes from turning on the backlight unless noted.

Condition: IF = 120 mA

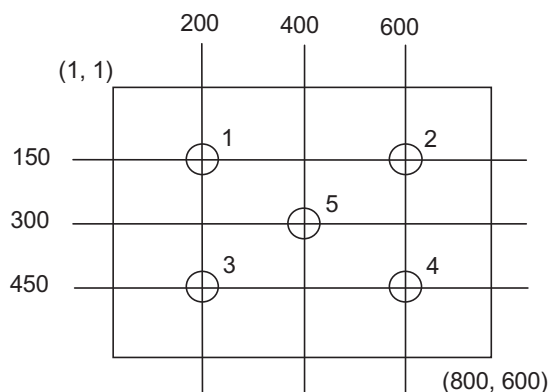
Measurement method for luminance and color coordinates is as follows.



The luminance is measured according to FLAT PANEL DISPLAY MEASUREMENTS STANDARD (VESA Standard).

*1) Measurement Point

Contrast Ratio, Luminance, Response Time, Viewing Angle, Color Coordinates: Display Center
Luminance Uniformity: point 1~5 shown in a figure below



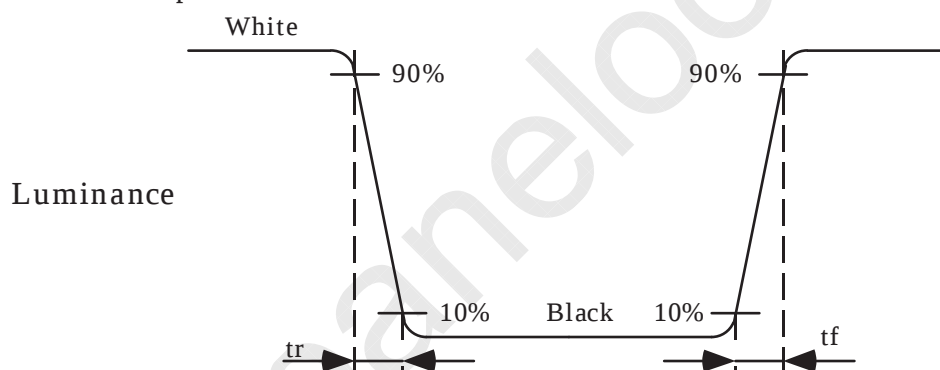
*2) Definition of Contrast Ratio

$CR = \text{Luminance with all white pixels} / \text{Luminance with all black pixels}$

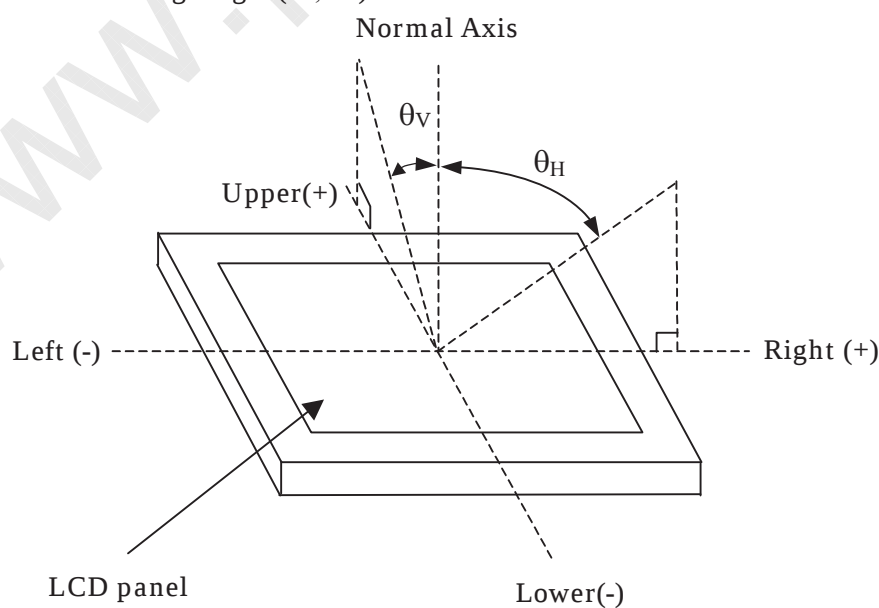
*3) Definition of Luminance Uniformity

$\Delta Lw = [Lw(\text{MAX}) / Lw(\text{MIN}) - 1] \times 100$

*4) Definition of Response Time

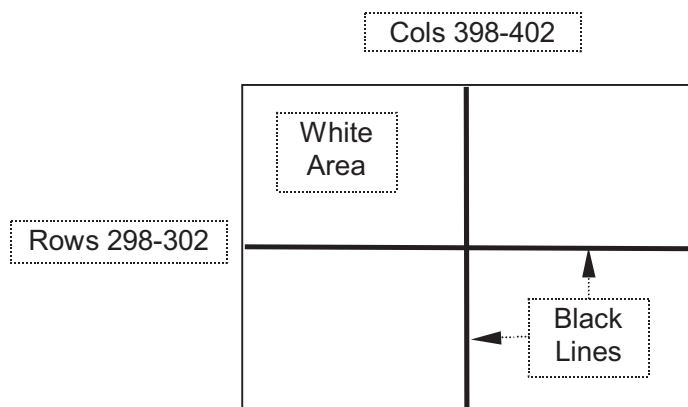


*5) Definition of Viewing Angle (θ_v , θ_H)



*6) Image sticking:

Continuously display the test pattern shown in the figure below for two-hours. Then display a completely white screen. The previous image shall not persist more than two seconds at 25°C.



TEST PATTERN FOR IMAGE STICKING TEST



10. RELIABILITY TEST CONDITION

(1) Temperature and Humidity

ITEM	CONDITIONS
HIGH TEMPERATURE HIGH HUMIDITY OPERATION	40 °C, 90 %RH, 240 (Non operation)
HIGH TEMPERATURE OPERATION	60 °C, 240
LOW TEMPERATURE OPERATION	- 20 °C, 240
HIGH TEMPERATURE STORAGE	60 °C, 240
LOW TEMPERATURE STORAGE	- 20 °C, 240
THERMAL SHOCK	BETWEEN - 20 °C (1 min) and 60 °C (1 min), 100 Cycles

(2) Shock and Vibration

ITEM	CONDITIONS
SHOCK (NON OPERATION)	Shock pulse: 1400 ms ² (150 ms) Acceleration: random Number of shocks: one shock per area perpendicular area or total area of input
VIBRATION (NON OPERATION)	Vibration pulse: 9.8 ms ² (1.0 ms) Acceleration: random Frequency range: 5 to 500 Hz Frequency sweep rate: 0.5 octaves/min Duration: one sweep from 5 to 500 Hz per area perpendicular area (each, , area: 1 hour, total 4 hours)

(3) Junction Temperature

The junction temperature of the product is as follows:

Part A: Normal operation, no additional power consumption. (e.g. no heating)

Part B: Transient operation, the power consumption is more.

Part C: No power, additional power consumption. (e.g. heating)



11. OTHER FEATURE

This LCD module complies with RoHS Directive.

RoHS: Restriction of use of certain hazardous substances
compliant



- Please connect the external LCD module to the monitor to ensure the external EMI.
- Be sure to connect the antenna to the correct port.

(2) OPERATING PRECAUTIONS

- a. Please be sure to turn off the power supply before connecting and disconnecting the antenna.
- Please do not handle the antenna in LCD module. They are a unit to the antenna and the antenna. If they are damaged, the antenna LCD module will not be able to be repaired.
- The antenna is a passive device. Please pay attention to the transmission and reception of the antenna. Please pay attention to the antenna.
- The antenna is a passive device. Please pay attention to the transmission and reception of the antenna. Please pay attention to the antenna.
- The antenna is a passive device. Please pay attention to the transmission and reception of the antenna. Please pay attention to the antenna.
- Please pay attention not to place the antenna in the LCD module. It is a unit to the antenna.
- Please do not place the antenna in the LCD module. It is a unit to the antenna.

(3) PRECAUTIONS WITH ELECTROSTATICS

- a. The LCD module uses CMOS IC on the output board and TFT LCD panel, and is sensitive to electrostatic discharge. Please be sure to use the correct method to connect the antenna to the antenna.
- Please be sure to use the correct method to connect the antenna to the antenna.

(4) STORAGE PRECAUTIONS

LCD module is sensitive to the storage temperature environment. The LCD module is sensitive to the storage temperature environment.

(5) SAFETY PRECAUTIONS

- a. When you use the antenna in LCD, the antenna is sensitive to the antenna.
- When you use the antenna in LCD, the antenna is sensitive to the antenna.
- Be sure to turn off the power supply when the antenna is not in use.



- LED driver modules are used to control the current of the LED.

(6) OTHERS

- A transistor into LCD panel is a very important parameter, moreover, another parameter, the resistance value is also a parameter. Please do not use the LCD module with Ultra-thin or a on the.
- Please pay attention to a panel is a LCD module not to contact with other materials in the environment.
- For the panel is a on the, please see the panel is a on the operation manual.